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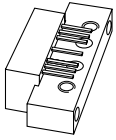
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# BGY785A

750 MHz, 18.5 dB gain push-pull amplifier

Rev. 6 — 29 September 2010

Product data sheet

## 1. Product profile

### 1.1 General description

Hybrid high dynamic range cascode amplifier module in a SOT115J package operating with a voltage supply of 24 V (DC).

#### CAUTION



This device is sensitive to ElectroStatic Discharge (ESD). Therefore care should be taken during transport and handling.

### 1.2 Features and benefits

- Excellent linearity
- Extremely low noise
- Silicon nitride passivation
- Rugged construction
- Gold metallization ensures excellent reliability

### 1.3 Applications

- CATV systems operating in the 40 MHz to 750 MHz frequency range

### 1.4 Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$G_p$	power gain	$f = 50$ MHz	18	18.5	19	dB
		$f = 750$ MHz	18.5	19.5	-	dB
$I_{tot}$	total current consumption (DC)	$V_B = 24$ V	[1] -	225	240	mA

[1] The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.



## 2. Pinning information

Table 2. Pinning

Pin	Description	Simplified outline	Symbol
1	input		
2	common		
3	common		
5	+V <sub>B</sub>		
7	common		
8	common		
9	output		

## 3. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BGY785A	-	rectangular single-ended package; aluminium flange; 2 vertical mounting holes; 2 × 6-32 UNC and 2 extra horizontal mounting holes; 7 gold-plated in-line leads	SOT115J

## 4. Limiting values

Table 4. Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions	Min	Max	Unit
V <sub>i</sub>	RF input voltage		-	65	dBmV
T <sub>stg</sub>	storage temperature		-40	+100	°C
T <sub>mb</sub>	mounting base temperature		-20	+100	°C

## 5. Characteristics

**Table 5. Bandwidth 40 MHz to 750 MHz**

$V_B = 24\text{ V}$ ;  $T_{case} = 30\text{ °C}$ ;  $Z_S = Z_L = 75\ \Omega$ ; unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit	
$G_p$	power gain	f = 50 MHz	18	18.5	19	dB	
		f = 750 MHz	18.5	19.5	-	dB	
SL	slope cable equivalent	f = 40 MHz to 750 MHz	0	0.9	2	dB	
FL	flatness of frequency response	f = 40 MHz to 750 MHz	-	$\pm 0.1$	$\pm 0.3$	dB	
$S_{11}$	input return losses	f = 40 MHz to 80 MHz	20	30	-	dB	
		f = 80 MHz to 160 MHz	18.5	29.5	-	dB	
		f = 160 MHz to 320 MHz	17	28	-	dB	
		f = 320 MHz to 640 MHz	15.5	26	-	dB	
		f = 640 MHz to 750 MHz	14	21	-	dB	
$S_{22}$	output return losses	f = 40 MHz to 80 MHz	20	29	-	dB	
		f = 80 MHz to 160 MHz	18.5	26	-	dB	
		f = 160 MHz to 320 MHz	17	23.5	-	dB	
		f = 320 MHz to 640 MHz	15.5	22	-	dB	
		f = 640 MHz to 750 MHz	14	24	-	dB	
CTB	composite triple beat	110 channels flat; $V_o = 44\text{ dBmV}$ ; measured at 745.25 MHz	-	-54.5	-53	dB	
$X_{mod}$	cross modulation	110 channels flat; $V_o = 44\text{ dBmV}$ ; measured at 55.25 MHz	-	-57.5	-56	dB	
CSO	composite second order distortion	110 channels flat; $V_o = 44\text{ dBmV}$ ; measured at 746.5 MHz	-	-62	-53	dB	
$d_2$	second order distortion		[1]	-	-77	-65	dB
$V_o$	output voltage	$d_{im} = -60\text{ dB}$	[2]	59	62	-	dBmV
F	noise figure	f = 50 MHz	-	4.5	5.5	dB	
		f = 450 MHz	-	-	5.5	dB	
		f = 550 MHz	-	-	5.5	dB	
		f = 600 MHz	-	-	6	dB	
		f = 750 MHz	-	6	7	dB	
$I_{tot}$	total current consumption (DC)		[3]	-	225	240	mA

[1]  $f_p = 55.25\text{ MHz}$ ;  $V_p = 44\text{ dBmV}$ ;  $f_q = 691.25\text{ MHz}$ ;  $V_q = 44\text{ dBmV}$ ; measured at  $f_p + f_q = 746.5\text{ MHz}$ .

[2] Measured according to DIN45004B;

$f_p = 740.25\text{ MHz}$ ;  $V_p = V_o$ ;  $f_q = 747.25\text{ MHz}$ ;  $V_q = V_o - 6\text{ dB}$ ;  $f_r = 749.25\text{ MHz}$ ;  $V_r = V_o - 6\text{ dB}$ ; measured at  $f_p + f_q - f_r = 738.25\text{ MHz}$ .

[3] The module normally operates at  $V_B = 24\text{ V}$ , but is able to withstand supply transients up to 30 V.

**Table 6. Bandwidth 40 MHz to 600 MHz** $V_B = 24\text{ V}$ ;  $T_{case} = 30\text{ °C}$ ;  $Z_S = Z_L = 75\ \Omega$ ; unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit	
G <sub>p</sub>	power gain	f = 50 MHz	18	18.5	19	dB	
		f = 600 MHz	18.5	-	-	dB	
SL	slope cable equivalent	f = 40 MHz to 600 MHz	0	-	1.5	dB	
FL	flatness of frequency response	f = 40 MHz to 600 MHz	-	-	±0.3	dB	
S <sub>11</sub>	input return losses	f = 40 MHz to 80 MHz	20	30	-	dB	
		f = 80 MHz to 160 MHz	18.5	29.5	-	dB	
		f = 160 MHz to 320 MHz	17	28	-	dB	
		f = 320 MHz to 600 MHz	16	26	-	dB	
S <sub>22</sub>	output return losses	f = 40 MHz to 80 MHz	20	29	-	dB	
		f = 80 MHz to 160 MHz	18.5	26	-	dB	
		f = 160 MHz to 320 MHz	17	23.5	-	dB	
		f = 320 MHz to 600 MHz	16	22	-	dB	
CTB	composite triple beat	85 channels flat; V <sub>o</sub> = 44 dBmV; measured at 595.25 MHz	-	-	-57	dB	
X <sub>mod</sub>	cross modulation	85 channels flat; V <sub>o</sub> = 44 dBmV; measured at 55.25 MHz	-	-	-59	dB	
CSO	composite second order distortion	85 channels flat; V <sub>o</sub> = 44 dBmV; measured at 596.5 MHz	-	-	-58	dB	
d <sub>2</sub>	second order distortion		[1]	-	-70	dB	
V <sub>o</sub>	output voltage	d <sub>im</sub> = -60 dB	[2]	61	-	dBmV	
F	noise figure	f = 50 MHz	-	4.5	5.5	dB	
		f = 450 MHz	-	-	5.5	dB	
		f = 550 MHz	-	-	5.5	dB	
		f = 600 MHz	-	-	6	dB	
I <sub>tot</sub>	total current consumption (DC)		[3]	-	225	240	mA

[1] f<sub>p</sub> = 55.25 MHz; V<sub>p</sub> = 44 dBmV; f<sub>q</sub> = 541.25 MHz; V<sub>q</sub> = 44 dBmV; measured at f<sub>p</sub> + f<sub>q</sub> = 596.5 MHz.

[2] Measured according to DIN45004B;

f<sub>p</sub> = 590.25 MHz; V<sub>p</sub> = V<sub>o</sub>; f<sub>q</sub> = 597.25 MHz; V<sub>q</sub> = V<sub>o</sub> - 6 dB; f<sub>r</sub> = 599.25 MHz; V<sub>r</sub> = V<sub>o</sub> - 6 dB; measured at f<sub>p</sub> + f<sub>q</sub> - f<sub>r</sub> = 588.25 MHz.

[3] The module normally operates at V<sub>B</sub> = 24 V, but is able to withstand supply transients up to 30 V.

**Table 7. Bandwidth 40 MHz to 550 MHz** $V_B = 24\text{ V}$ ;  $T_{case} = 30\text{ °C}$ ;  $Z_S = Z_L = 75\ \Omega$ ; unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
G <sub>p</sub>	power gain	f = 50 MHz	18	18.5	19	dB
		f = 550 MHz	18.5	-	-	dB
SL	slope cable equivalent	f = 40 MHz to 550 MHz	0	-	1.5	dB
FL	flatness of frequency response	f = 40 MHz to 550 MHz	-	-	±0.3	dB
S <sub>11</sub>	input return losses	f = 40 MHz to 80 MHz	20	30	-	dB
		f = 80 MHz to 160 MHz	18.5	29.5	-	dB
		f = 160 MHz to 320 MHz	17	28	-	dB
		f = 320 MHz to 550 MHz	16	26	-	dB
S <sub>22</sub>	output return losses	f = 40 MHz to 80 MHz	20	29	-	dB
		f = 80 MHz to 160 MHz	18.5	26	-	dB
		f = 160 MHz to 320 MHz	17	23.5	-	dB
		f = 320 MHz to 550 MHz	16	22	-	dB
CTB	composite triple beat	77 channels flat; V <sub>o</sub> = 44 dBmV; measured at 547.25 MHz	-	-61	-60	dB
X <sub>mod</sub>	cross modulation	77 channels flat; V <sub>o</sub> = 44 dBmV; measured at 55.25 MHz	-	-61	-60	dB
CSO	composite second order distortion	77 channels flat; V <sub>o</sub> = 44 dBmV; measured at 548.5 MHz	-	-67.5	-60	dB
d <sub>2</sub>	second order distortion		[1] -	-	-72	dB
V <sub>o</sub>	output voltage	d <sub>im</sub> = -60 dB	[2] 62	-	-	dBmV
F	noise figure	f = 50 MHz	-	4.5	5.5	dB
		f = 450 MHz	-	-	5.5	dB
		f = 550 MHz	-	-	5.5	dB
I <sub>tot</sub>	total current consumption (DC)		[3] -	225	240	mA

[1] f<sub>p</sub> = 55.25 MHz; V<sub>p</sub> = 44 dBmV; f<sub>q</sub> = 493.25 MHz; V<sub>q</sub> = 44 dBmV; measured at f<sub>p</sub> + f<sub>q</sub> = 548.5 MHz.

[2] Measured according to DIN45004B;

f<sub>p</sub> = 540.25 MHz; V<sub>p</sub> = V<sub>o</sub>; f<sub>q</sub> = 547.25 MHz; V<sub>q</sub> = V<sub>o</sub> - 6 dB; f<sub>r</sub> = 549.25 MHz; V<sub>r</sub> = V<sub>o</sub> - 6 dB; measured at f<sub>p</sub> + f<sub>q</sub> - f<sub>r</sub> = 538.25 MHz.

[3] The module normally operates at V<sub>B</sub> = 24 V, but is able to withstand supply transients up to 30 V.

**Table 8. Bandwidth 40 MHz to 450 MHz**

$V_B = 24\text{ V}$ ;  $T_{case} = 30\text{ °C}$ ;  $Z_S = Z_L = 75\ \Omega$ ; unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit	
G <sub>p</sub>	power gain	f = 50 MHz	18	18.5	19	dB	
		f = 450 MHz	18.5	-	-	dB	
SL	slope cable equivalent	f = 40 MHz to 450 MHz	0	-	1.5	dB	
FL	flatness of frequency response	f = 40 MHz to 450 MHz	-	-	±0.3	dB	
S <sub>11</sub>	input return losses	f = 40 MHz to 80 MHz	20	30	-	dB	
		f = 80 MHz to 160 MHz	18.5	29.5	-	dB	
		f = 160 MHz to 320 MHz	17	28	-	dB	
		f = 320 MHz to 450 MHz	16	26	-	dB	
S <sub>22</sub>	output return losses	f = 40 MHz to 80 MHz	20	29	-	dB	
		f = 80 MHz to 160 MHz	18.5	26	-	dB	
		f = 160 MHz to 320 MHz	17	23.5	-	dB	
		f = 320 MHz to 450 MHz	16	22	-	dB	
CTB	composite triple beat	60 channels flat; V <sub>o</sub> = 44 dBmV; measured at 445.25 MHz	-	-	-61	dB	
X <sub>mod</sub>	cross modulation	60 channels flat; V <sub>o</sub> = 44 dBmV; measured at 55.25 MHz	-	-	-60	dB	
CSO	composite second order distortion	60 channels flat; V <sub>o</sub> = 44 dBmV; measured at 446.5 MHz	-	-	-61	dB	
d <sub>2</sub>	second order distortion		[1]	-	-	-75	dB
V <sub>o</sub>	output voltage	d <sub>im</sub> = -60 dB	[2]	64	-	-	dBmV
F	noise figure	f = 50 MHz	-	4.5	5.5	dB	
		f = 450 MHz	-	-	5.5	dB	
I <sub>tot</sub>	total current consumption (DC)		[3]	-	225	240	mA

[1] f<sub>p</sub> = 55.25 MHz; V<sub>p</sub> = 46 dBmV; f<sub>q</sub> = 391.25 MHz; V<sub>q</sub> = 46 dBmV; measured at f<sub>p</sub> + f<sub>q</sub> = 446.5 MHz.

[2] Measured according to DIN45004B;

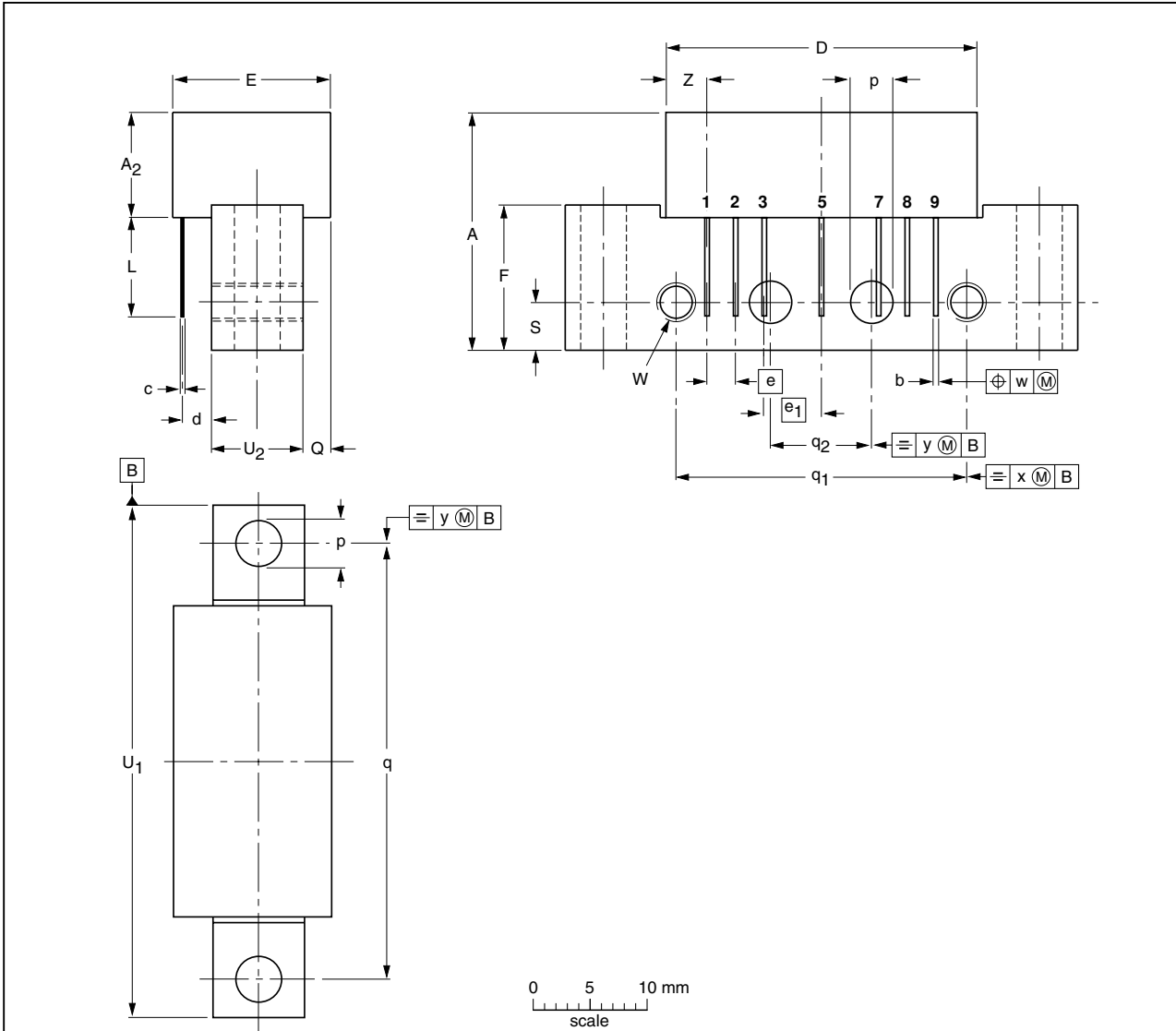
f<sub>p</sub> = 440.25 MHz; V<sub>p</sub> = V<sub>o</sub>; f<sub>q</sub> = 447.25 MHz; V<sub>q</sub> = V<sub>o</sub> - 6 dB; f<sub>r</sub> = 449.25 MHz; V<sub>r</sub> = V<sub>o</sub> - 6 dB; measured at f<sub>p</sub> + f<sub>q</sub> - f<sub>r</sub> = 438.25 MHz.

[3] The module normally operates at V<sub>B</sub> = 24 V, but is able to withstand supply transients up to 30 V.

## 6. Package outline

Rectangular single-ended package; aluminium flange; 2 vertical mounting holes; 2 x 6-32 UNC and 2 extra horizontal mounting holes; 7 gold-plated in-line leads

SOT115J



DIMENSIONS (mm are the original dimensions)

UNIT	A max.	A <sub>2</sub> max.	b	c	D max.	d	E max.	e	e <sub>1</sub>	F	L min.	p	Q max.	q	q <sub>1</sub>	q <sub>2</sub>	S	U <sub>1</sub>	U <sub>2</sub>	W	w	x	y	Z max.
mm	20.8	9.5	0.51 0.38	0.25	27.2	2.04 2.54	13.75	2.54	5.08	12.7	8.8	4.15 3.85	2.4	38.1	25.4	10.2	4.2	44.75 44.25	8.2 7.8	6-32 UNC	0.25	0.7	0.1	3.8

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT115J						04-02-04- 10-06-18

Fig 1. Package outline SOT115J



## 7. Revision history

**Table 9. Revision history**

Document ID	Release date	Data sheet status	Change notice	Supersedes
BGY785A v.6	20100929	Product data sheet	-	BGY785A v.5
Modifications:		<ul style="list-style-type: none"><li>The format of this data sheet has been redesigned to comply with the new identity guidelines of NXP Semiconductors.</li><li>Legal texts have been adapted to the new company name where appropriate.</li><li>Package outline drawings have been updated to the latest version.</li></ul>		
BGY785A v.5 (9397 750 14772)	20050322	Product data sheet	-	BGY785A v.4
BGY785A v.4 (9397 750 08808)	20011115	Product specification	-	BGY785A v.3
BGY785A v.3 (9397 750 05443)	19990330	Product specification	-	BGY785A v.2
BGY785A v.2 (9397 750 02142)	19970410	Product specification	-	n.a.

## 8. Legal information

### 8.1 Data sheet status

Document status <sup>[1][2]</sup>	Product status <sup>[3]</sup>	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
Product [short] data sheet	Production	This document contains the product specification.

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[2] The term 'short data sheet' is explained in section "Definitions".

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Please be aware that important notices concerning this document and the product(s) described herein, have been included in section 'Legal information'.

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